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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,295	03/03/2004	Yoshinobu Suehiro	PTGF-03109.	3532

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC  
8321 OLD COURTHOUSE ROAD  
SUITE 200  
VIENNA, VA 22182-3817

EXAMINER
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ARENA, ANDREW OWENS

ART UNIT	PAPER NUMBER
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2811

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/791,295

Applicant(s)

SUEHIRO ET AL.

Examiner

Andrew O. Arena

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 and 26-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 26-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/20/2006 has been entered.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Light Emitting Apparatus Comprising Lead Mounted LED Provided in Phosphor Coated Recess and Method of Making Same.

### ***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action (dated 01/31/2006).

Claims 1, 2, 4, 33, 35 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Juestel (JP Pub 2002-223008).

A machine translation from the JPO website of the Juestel reference was provided in a prior office action (dated 01/31/2006) and is referred to herein.

**Re claim 1**, Juestel discloses (Drawing 1) a light emitting apparatus (1), comprising:

a semiconductor light emitting element (3) that emits light with a predetermined wavelength (¶27 ln 5);

a light-transmitting portion (6; ¶24 ln 1-3) that includes a recess (at 2) to house the semiconductor light emitting element (3), the light-transmitting portion being of a light-transmitting material (¶24 ln 1-3) and the recess being formed with a predetermined size; and

a phosphor layer portion (4; ¶24 ln 5) that is thinly formed along the surface of the recess, the phosphor portion including a phosphor to be excited by irradiating light emitted from the semiconductor light emitting element (inherent in fluorescent substance, ¶24 ln 5).

The product-by-process limitation "provided by molding the light-transmitting material" has not been given patentable weight. See MPEP § 2113.

**Re claim 2**, Juestel discloses (Drawing 1) the light-transmitting portion has a light convergence shape to converge light (inherent in the convex lens shape 6) emitted from the light emitting element (¶24 ln 1-3).

**Re claim 4**, Juestel discloses (Drawing 1) the recess is located close to the semiconductor light emitting element along the profile of the semiconductor light emitting element (apparent in Drawing 1).

**Re claim 33**, Juestel discloses said light emitting element emits light having a wavelength of 450nm (¶13).

**Re claim 35**, Juestel discloses (Drawing 1) said phosphor layer portion (2) comprises uniform thickness.

**Re claim 38**, Juestel discloses (Drawing 1) said phosphor layer portion (2) comprises an inner surface having a shape which is dependent upon a shape of said recess (in that both have the same shape).

Claim 37 is rejected under 35 U.S.C. 102(b) as being anticipated by Lowery (5,959,316).

**Re claim 37**, Lowery discloses (Fig 1 + Fig 4) a light emitting apparatus, comprising:

a light emitting element (18; col 2 ln 8) that emits light with a predetermined wavelength;

a molded lens (26) comprising a recessed portion (in which 18 lies) which has a predetermined size and is formed over said light emitting element; and

a phosphor layer (Fig 4: 66; col 2 ln 44) formed on a surface of said recessed portion, said phosphor layer including a material (col 2 ln 19) which is excited by light emitted from the light emitting element,

wherein a sealant (64; col 2 ln 43) is formed between said light emitting element and said phosphor layer, for sealing said light emitting element).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action (dated 01/31/2006).

Claims 3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel as applied to claim 1 above, and further in view of Roberts (US 6,335,548).

**Re claim 3**, Juestel discloses the semiconductor light emitting element is an LED element (abstract ln 1-2) that emits light from its light emission surface located on the opposite side of its mounting surface (light is emitted from said surface).

Juestel differs from the claimed invention only in not expressly disclosing a flip-chip type LED.

Roberts teaches the use of a flip-chip type LED (col 20 ln 15-37).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that the LED of Juestel is a flip-chip type LED, as taught by Roberts; at least to extend operation (Roberts: col 20 ln 33-37).

**Re claim 5**, Juestel differs from the claimed invention only in not disclosing a plurality of LED elements.

Roberts teaches (Fig 19) a plurality of LED elements (col 29 ln 64-65).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Juestel in view of Roberts such that the semiconductor light emitting element is composed of a plurality of LED elements

disposed in a predetermined arrangement; at least to produce light of any color desired (Roberts: col 30 ln 12-20).

**Re claim 6**, Juestel differs from the claimed invention only in not disclosing a plurality of LED elements.

Roberts teaches (Fig 19) a plurality of LED elements (col 29 ln 64-65) with different emission wavelengths (col 30 ln 12-14).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Juestel in view of Roberts such that the semiconductor light emitting element is composed of a plurality of LED elements with different emission wavelengths disposed in a predetermined arrangement; at least to produce light of any color desired (col 30 ln 12-20).

Claims 7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel in view of Roberts.

**Re claim 7**, Juestel discloses the structure of claim 1, therefore inherently disclosing the steps of:

preparing a light-transmitting portion (6) that includes a recess (at 2) to house a semiconductor light emitting element (3),

the light-transmitting portion being of a light-transmitting material ([0024] ln 1-3) and the recess being formed with a predetermined size by molding (shaping) the light-transmitting material,

the recess being provided with a phosphor layer (4; [0024] ln 5) that is thinly formed along the surface of the recess such that the phosphor layer of the recess surrounds an upper portion of the semiconductor light emitting element.

Juestel differs from the claimed invention only in not expressly disclosing how contact to the light emitting apparatus is made.

Roberts discloses (Fig 19) a light emitting apparatus, inherently disclosing a method for making said light emitting apparatus, comprising:

- forming an electrode (1902) of metal material (col 25 ln 13);
- mounting a semiconductor light emitting element (1909) on (indirectly, by way of 203) the electrode;
- positioning a light-transmitting portion (401) adjacent to the electrode; and
- bonding the light-transmitting portion onto the electrode.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method Juestel in view of Roberts to further comprise: forming an electrode of metal material; mounting the semiconductor light emitting element on the electrode; positioning the light-transmitting portion adjacent to the electrode; and bonding the light-transmitting portion onto the electrode such that the phosphor layer of the recess surrounds an upper portion of the semiconductor light emitting element; at least to allow electrical connection to the apparatus of Juestel.

**Re claim 9**, Juestel as modified above discloses (Roberts Fig 19b) the electrode is a lead electrode (1902; col 30 ln 6-7) provided on (indirectly, via 203) the surface of a submount member (204) of high thermal conductivity (col 10 ln 47, 54).



**Re claim 10**, Juestel as modified above discloses (Roberts Fig 19b) the electrode is a copper-foil electrode (col 12 ln 28-29, 41-42) provided through an insulation layer (203; col 9 ln 6) on the [side] surface of a base member (204) of high thermal conductivity (col 10 ln 47, 54).

**Re claim 11** Juestel as modified above differs from the claimed invention only in not expressly disclosing a flip-chip type LED.

Roberts discloses the semiconductor light emitting element is flip-chip (col 20 ln 15-37) bonded onto the electrode (col 20 ln 24-29).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that the LED of the combined is a flip-chip type LED, as taught by Roberts; at least to extend operation (Roberts col 20 ln 33-37).

Claim 8 is rejected under 35 USC 103(a) as being unpatentable over Juestel in view of Roberts as applied to claim 7 above, further in view of Mueller (US 6,417,019).

**Re claim 8**, Juestel as modified above discloses the phosphor layer is formed on the surface of the recess formed by molding (Juestel: 4; [0024] ln 5).

Juestel as modified above differs from the claimed invention only in not expressly disclosing spraying a phosphor material.

Mueller teaches spraying a phosphor material (col 7 ln 19-20).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to spray the phosphor material, as taught by Mueller, on the

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surface of the recess of Juestel after forming the recess; at least to utilize a known phosphor layer deposition method (Mueller: col 7 ln 19-20).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel as applied to claim 1 above, and further in view of Lowery.

**Re claim 26**, Juestel differs from the claimed invention only in not disclosing a sealant formed between the light emitting element and the phosphor layer.

Lowery discloses (Fig 4) a sealant (64; col 3 ln 27) formed between said light emitting element and said phosphor layer (66; col 3 ln 29). Lowery discloses said sealant comprises a viscous, transparent, UV cured resin (col 3 ln 21-24).

Lowery does not expressly disclose the material of the transparent resin.

Examiner takes official notice that silicon resin is a well-known UV cureable resin.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Juestel in view of Lowery such that a sealant is formed between said light emitting element and said phosphor layer portion, for sealing said light-emitting element, wherein said sealant comprises a transparent silicon resin; at least to prevent the annular ring problem (Lowery: col 3 ln 33).

Claims 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel as applied to claim 1 above, and further in view of Chen (US 6,531,328).

**Re claim 27**, Juestel differs from the claimed invention only in not expressly disclosing how contact to the light emitting apparatus is made.

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Chen discloses (Fig 14) a plurality of leads (17, 18) and a submount (8) formed on said plurality of leads, said light emitting element (3) being formed on said submount.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that Juestel use a connection structure similar to Chen, comprising a plurality of leads and a submount formed on said plurality of leads, said light emitting element being formed on said submount; at least to allow electrical connection to the apparatus of Juestel.

**Re claim 28**, Juestel as modified above discloses said submount comprises a thermally conductive submount (Chen: col 5 ln 66).

**Re claim 29**, Juestel as modified above discloses said light transmitting portion is formed (indirectly) on said plurality of leads, said recess being aligned with said light emitting element.

**Re claim 30**, Juestel as modified above discloses (Chen: Fig 14) a wiring pattern (17a) formed on said submount, said light emitting element (3) being mounted on said wiring pattern.

**Re claim 31**, Juestel as modified above discloses (Chen: 14) said light emitting element is flip-chip bonded through bumps (21) onto the wiring pattern.

**Re claim 32**, Juestel as modified above discloses (Chen: Fig 8) said submount (8) comprises a viahole (14) said wiring pattern (17a) being electrically connected though said viahole (col 5 ln 37-38) to said lead (17).

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel as applied to claim 1 above, and further in view of Keller (US 2004/0012027).

**Re claim 34**, Juestel differs from the claimed invention in not disclosing said phosphor comprises Ce:YAG.

Keller teaches that Ce:YAG is a typical phosphor.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that, in view of Keller, said phosphor layer portion comprises Ce:YAG; at least to use a typical phosphor.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel as applied to claim 1 above, and further in view of Lowery.

**Re claim 36**, Juestel differs from the claimed invention only in not disclosing a sealant formed between the light emitting element and the phosphor layer.

Lowery discloses a structure (Fig 4), inherently disclosing a method for making said structure, comprising:

forming a sealant (64; col 3 ln 27) between said light emitting element and said phosphor layer (66; col 3 ln 29, said forming said sealant comprising:

injecting (inserting) said sealant into said recess; and

fixing a light transmitting portion (68) onto said light emitting element such that said light emitting element is sealed with said sealant.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method Juestel in view of Lowery to further

comprise: forming a sealant between said light emitting element and said phosphor layer, for sealing said light emitting element, said forming said sealant comprising: injecting (inserting) said sealant into said recess; and fixing said light transmitting portion onto said light emitting element such that said light emitting element is sealed with said sealant; at least to prevent the annular ring problem (Lowery: col 3 ln 33).

### ***Response to Arguments***

Applicant's arguments filed 10/20/2006 have been fully considered but they are not persuasive.

Applicant asserts that all claims are allowable over the art of record, but does not provide a convincing line of reasoning to support said assertion. In particular, applicant has not overcome examiner's arguments in the Advisory Action dated 09/29/2006, reproduced below for ease of reference.

Applicant's arguments are premised primarily on distinctions between the methods by which the prior art and applicant's claimed structures are made, supplemented by allegations that examiner's combinations are non-obvious. Neither premise is persuasive.

The independent claims have been amended to recite the "light emitting element [is] inserted into said [recess]". Juestel and Lowery are the only references relied upon for this feature, and both references disclose an LED in a recess (Juestel Drawing 1, Lowery Fig 4). The appropriate interpretation of a "light emitting element [is] INSERTED

into said [recess]" is simply an "LED is IN said [recess]". This interpretation is supported by at least four significant factors, as follows.

- 1) In the reply filed 09/20/2006, applicant directed attention (pg 6) to the present application at Fig 5B and pg 12 ln 26-28 as supporting the claimed recitation, both of which merely describe an LED in a recess, not a process by which an LED is inserted into a recess.
- 2) It is not clear to the examiner that such a process is even supported by the original disclosure, but even if it were, limitations from the specification are not read into the claims. See MPEP 2145(VI).
- 3) Applicant's arguments can overcome the references only if said recitation was regarded as a method step. However, the patentability of a product does not depend on its method of production. See MPEP 2113.
- 4) Regarding said method step, examiner notes that the method was non-elected without traverse in the reply filed 11/23/2005.

Applicant alleges the references are "unrelated" by selecting and comparing certain limiting portions of the disclosures as if said portions defined the field of endeavor of their respective references. Examiner submits that the field of endeavor of applicant's invention and every single cited reference is packaging light emitting diodes.

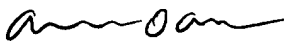
Examiner has established a *prima facie* case of obviousness and provided proper motivations, see MPEP 2143.01 and 2144; applicant has burden to rebut, see MPEP 2142(¶1). Attorney arguments are not the kind of factual evidence that is required to rebut a *prima facie* case of obviousness, see MPEP 2145(I).

**Conclusion**

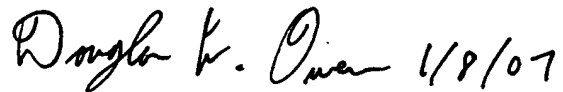
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 571- 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Andrew O Arena  
4 January 2007



DOUGLAS W. OWENS  
PRIMARY EXAMINER